

Utilizing PowerPoint Presentation to Promote Fall Prevention Among Older Adults

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Abstract

This study evaluated a PowerPoint home safety (PPHS) presentation in enhancing awareness, knowledge and behavior change among senior center attendees in southern Illinois. Twelve centers were utilized as data collection sites in a pretest-posttest control group design. Through stratified randomization, centers were placed into categories (high, medium, and low) based on counties' population size and income. Next, centers were randomly assigned to research groups, which consisted of six centers and fifty-two participants. Experimental group received pretest, PPHS presentation and posttest, while control group received pre and posttest. Expert panel reviewed instruments prior to data collection. In addition, pre-pilot and pilot studies were conducted to assess validity, reliability, and feasibility. Analyses of variance (ANOVA) were performed comparing mean differences between pre and posttests regarding knowledge, awareness and behavior. Findings revealed awareness and knowledge were significantly different among groups. Experimental group showed a greater mean difference (knowledge 1.37, awareness 0.74) than control group (knowledge 0.29, awareness 0.21). No significant difference was found among groups regarding behavior. PowerPoint presentations like PPHS can serve as a reminder of what changes need to be made at home, in addition to reinforcing existing awareness and knowledge for seniors.

Introduction

Today, injuries are a serious threat to the health and well-being of many older Americans. Unintentional injuries (without purposeful intent) rank sixth among the ten leading causes of deaths among individuals age 55 to 74 years old. Within the category of deaths due to unintentional injuries, motor vehicle accidents rank first, followed by falls for individuals age 65 to 74. Among individuals age 75 and older, falls are the leading cause of death worldwide (National Center for Injury Prevention and Control [NCIPC], n.d.).

Each year nearly one third of older adults over the age of 65 will experience a fall (Fredrikson, 2004; NCIPC, 2007). Falls account for one third of all unintentional home injury deaths, more than 40% of all nonfatal home injuries, and

more than one third of all injuries resulting in an emergency room visit. In addition, more than half (54%) of all fatal and nonfatal falls occur at home, supporting the need to focus fall prevention efforts for the home environment (National Safety Council, 2004). Falls are also the most prominent reason for hospitalization among the older population (DDHS, 2000).

The most common fall-related injuries are fractures of the hip, spine and forearm. More than 95% of hip fractures among adults, ages 65 and older, are due to falls. Complications of fall related hip fractures lead to the greatest number of health problems and death. Tragically, nearly one-fourth of all patients with hip fractures die within 12 months of the injury because of complications, such as onset of infections, depression, anxiety, fear of falling, and poor coping strategies during the recovery period (Fredrikson, 2004; NCIPC, 2007; Tideiksaar, 1997). More than 50% of the older patients surviving hip fractures are discharged to nursing homes, and nearly one-half of these patients are still in nursing homes one year later (Coogler & Wolf, 1999). Hip fracture survivors experience a 10% to 15% decrease in life expectancy and a meaningful decline in overall quality of life (Fuller, 2000). In the United States, hospital admissions for hip fractures among people over age 65 have steadily increased. Treatment of injuries and complications associated with falls cost more than \$20 billion each year. It is highly likely that the number of falls, along with serious injuries are preventable by reducing some of the most obvious risk factors. Making people aware of the risk factors is the first step (Fredrikson, 2004; Hutton, 2000; Loew, 1993; NCIPC, 2007; Nikkanen, 2005).

The overall contributing factors for falls can be divided into two categories: (a) internal factors - those associated with aging, disease processes, orientation status, medication effects / drug interactions, balance problems, and diminished vision; and (b) external factors - those controlled by the individual, which includes obstacles, footwear, trip-hazards, equipment condition, and floor coverings (Freedman & Weber, 1990). Regardless of the reasons, falls can be devastating and often produce lifelong psychosocial effects that contribute to repetitive incidents (Ritzel et al., 2000). Even though most falls do not end in death or result in significant physical injuries initially, the psychological impact of falling often results in lifelong fear (Fuller, 2000; Newton, 2003). The fear of falling may cause an individual, who has functioned independently in the past, to start limiting their activities. The reduction in activity can lead to a downward spiral effect on the individual's health and actually increase

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the risk of falls, in addition to loss of exercise and reduced social and mental stimulation. Inactivity can also lead to a weaker body, especially for aging adults, thus setting the stage for another fall. Falls can also result in disability, which can reduce the quality of life and independence (Hutton, 2000; Lord, Sherrington, & Menz, 2001; Rubenstein, 2006).

According to a study conducted by Austin-Wells, Zimmerman, and McDougall (2003), the optimal presentation format preferred by community-dwelling older adults, ages 65 and over, was PowerPoint as opposed to flip charts and overhead projections. Focus group participants either lived in an assisted-living center, apartment complex for low-income seniors, or attended a senior-activity center. Researchers concluded that sensory changes that normally occur with age influenced the preferred presentation mode among participants. PowerPoint, as a medium, was able to address visual, auditory, and attention problems identified by the focus group participants (Austin-Wells, Zimmerman, and McDougall, 2003).

This study investigated the effectiveness of a PowerPoint home safety (PPHS) presentation in enhancing awareness and knowledge among older adults living in southern Illinois communities. In addition, the study explored the idea of promoting behavior change among older adults who previously may have not acted to reduce their risk for falling in and around the home.

Study Design

The researcher utilized a quasi-experimental design, known as the pretest-posttest control group design. The design consisted of two research groups. The experimental group received the pretest, PPHS presentation and posttest, while the control group received the pre and posttest. The researcher conducted a stratified randomization to separate 13 senior centers into three categories (high, middle, and low), based on the population size and median family income of the county in which each center was located. Through sampling with replacement, senior centers were randomly selected from each category to serve as experimental or control sites. The one center not selected for a group served as the pilot site for the study.

Instrumentation

The researcher considered three constructs, awareness (stage level), knowledge, and behavior as the foci for the study. The pre and posttest were designed to assess changes in each construct before and after administering the intervention, which was the PPHS presentation. The pretest consisted of a 13-page, paper document with 26 questions with four sections: awareness level, knowledge, behavior, and basic demographical information. The posttest was identical to the pretest with the omission of the demographical section. Therefore, the posttest consisted of 12 pages with only three section: awareness, knowledge, and behavior. The Awareness (stage level) section contained one question

with seven levels of awareness for participants to choose among regarding fall risks and home safety. The researcher utilized a scale from 1 (unaware) to 7 (aware and already have made changes) to score this section. The Knowledge section consisted of 12 multiple-choice questions to assess participants' knowledge of the risks for falls and home safety. Correct answers were coded as "1", while incorrect answers were coded as "0". The total score for the knowledge section ranged from 0 (no knowledge) to 12 (very knowledgeable). The Behavior section consisted of eight questions to assess change in behavior among participants. The questions were based on two parts. The first part contained "yes" and "no" responses. For example, "In the past month, have you made any changes to your home to keep you from falling"? Participants answering "yes" to a behavior question received a score of "1", while participants answering "no" to any questions received a score of "0". The total score for the behavior section ranged from 0 (no change) to 8 (high level of change). The second part allowed participants to mark areas, using a check mark, regarding changes made in the home. If participants answered "yes," they were asked to check the reason(s) for making the changes. If participants answered "no," they were asked to check the reason(s) for not making any changes." The Demographic section consisted of five questions that provided a description of the sample. These questions included age, sex, number of falls, living arrangement, and education level of participants.

Intervention

The Precaution Adoption Process Model (PAPM) was utilized as the theoretical framework for assessing participants' awareness level (stage level) during the pre and posttest, in addition to designing the PowerPoint home safety (PPHS) presentation. The PAPM model helps to explain how individuals come to the decision to take action in adopting a safety precaution and how individuals translate that decision into action (Weinstein, 1988; Weinstein & Sandman, 1992). The PAPM consists of seven stages (unaware, unengaged, undecided, decided not to take action, decided to take action, action, and maintenance). This model is most applicable with the adoption of new precautions or the abandonment of risky behaviors that requires deliberate action.

The PPHS presentation consisted of 28 slides and lasted for eight minutes. Each slide was equipped with narrations and tailored messages designed to address individuals who were undecided about taking home safety precautions. The researcher felt that it was important to inform individuals about their risks for falls in order for them to make a decision whether to accept or not to accept recommended precautions.

The goal of the PPHS presentation was to encourage movement of participants closer to taking action for reducing the risks for falls at home. In other words, the design of the presentation was to promote movement from an undecided stage (stage 3) to a stage of deciding to act (stage 5).

According to PAPM, individuals who are resistant to taking action (stage 4) are not included in the continuous path towards action (stages 1, 2, 3, 5, 6, and 7). In addition, the presentation provided information to promote movement from deciding to take action (stage 5) to an action stage (stage 6) for individuals wanting to make revisions. Individuals within the earlier stages of the PAPM, stage 1 and 2, also could benefit from the presentation. The presentation would provide tailored messages to move these individuals to the stage of trying to decide whether to take action or not (stage 3). In addition, individuals in the earlier stages were not expected to jump stages and change behavior with one intervention. They were expected to have a change awareness (stage) and knowledge level. For individuals in stages 6, and 7, the presentation would not be effective, because these individuals were in the process of making changes or had already made changes to their homes.

The content of the test (pre and posttest) and the presentation were based on current literature pertaining to falls and older adults. In addition, information was retrieved from various home safety programs, fall prevention checklists and presentations (Home Safety Council, 2004; Nikkanen, 2005; Rogers, Rogers, Takeshima, & Islam, 2004; Stevens & Olson, 2004; U.S. Consumer Product Safety Commission, n.d.).

Prior to Study

The researcher consulted an expert panel to assist in the face and content validity of the instrument and intervention. This five-member panel consisted of professional with expertise and experience health education, injury prevention, research design and evaluation, older adults, and/or fall prevention.

A pre-pilot study was conducted with older adults from a local Health Ministry Organization located in southern Illinois to evaluate the appropriateness of the instrument and presentation for targeted audience. Seventeen individuals, ranging from age 60 to 91 years old, participated in the study. There were seven males (41%) and ten females (59%). Eight participants (47%) lived alone, while nine (53%) lived with their spouse. During the last 12 months, most adults had not experienced a fall (59%). While 15 participants (88%) had received some form of education after high school (i.e. some college, college graduate, some graduate school, or graduate / professional degree), only two participants (12%) reported being high school graduates. Each participant completed the pretest and viewed PowerPoint home safety (PPHS) presentation. After viewing the presentation, participants completed a brief evaluation questionnaire pertaining to the design of the instrument and intervention. The following revisions were made in response to participants' comments and the researcher's observations during the pre-pilot study: (a) page number and directions were insert at the bottom of each page of pre and posttest to guide participants; (b) questions were added to pre and posttest, as well as presentation slides to address changes

that could be made in the garage and outside the home to avoid falling; (c) speakers were utilized to increase presentation volume; and (d) check off boxes were utilized for responses instead of lines to shorten the amount of time taken for participants to complete the pre and posttest.

A pilot study was conducted at the Happy Days Senior Center in Cairo, Illinois. The goals of the pilot study were to examine the feasibility of the data collection process and return rate of participants, in addition to determining the reliability of the instrument utilized to measure change. Older adults attending the center were solicited for the two-day study (30 days apart) via a cover letter explaining the nature of the study, in addition to voluntary participation. The sample consisted of 13 participants, ranging from age 62 to 83 years old. Four males (31%) and nine females (69%) took part in the pilot study. Originally, 15 older adults were present on day one, but only 13 returned for day two (87% return rate). Seven participants lived alone (54%), while four participants lived with their spouse (31%) and two lived with their family (15%). Ten adults reported not having experienced a fall during the last 12 months (77%). In addition, education levels varied from less than 12th grade (31%; $n = 4$), high school graduate / GED (39%; $n = 5$), some college / trade school (23%; $n = 3$) to graduate / professional degree (8%; $n = 1$). On day one of the pilot study, participants completed the pretest and viewed the eight-minute PPHS presentation. On day two, 30 days following the pretest, the researcher returned to each center to administer the posttest. The researcher incorporated the following changes to enhance the data collection process: 1) arriving two hours prior to the lunch schedule to allow enough time for the study; 2) soliciting participants upon arrival at the senior center to avoid losing volunteers once lunch began; and 3) simplifying instructions on pre and posttest to avoid explaining instructions to every individual.

Internal item consistency and reliability estimates were conducted for the instrument following the pilot study. The overall reliability coefficient for the instrument was .7239 (awareness .5232, knowledge .6580, and behavior .9018).

Methods

Sample

The sample selection criteria were based on individuals aged 60 years and older, ambulatory, and living independently at home, in addition to completing the pre and post study sessions. The sample comprised of 104 older adults attending twelve focal point senior centers within southern Illinois. A focal point center refers to a facility, such as a senior center, established to encourage the maximum collocation and coordination of services for older individuals (U.S. Code, 2003), such as support services, educational sessions, congregate meals, and transportation on a daily. Originally, 126 older adults completed the pretest, but only 104 returned (completed) for the posttest (82.5% return rate). The number of older adults per center that participated varied from three

to thirteen, with an average of 8.7 participants per center. The average age was 77.97. Thirty-two (30.8%) participants were male and 72 (69.2%) were females. While seventy-two (69.2%) participants lived alone, 76 (73.1%) participants had not experienced a fall within the past 12 months. Regarding education level, 35 (33.6%) participants had completed high school, while 18 (17.3%) participants had received a bachelors/graduate degree.

Data Collection

After receiving Human Subjects Committee approval, in addition to the directors of each senior center, the researcher started contacting centers to set up convenient times for conducting the study. From October 1 through December 15, 2006, the researcher visited 12 centers (twice), spending approximately two hours per site to collect data. Traveling time for each center varied from 20 minutes to 4 hours.

On day one, participants were recruited via cover letter upon entering the senior center. Each participant's name, telephone number, and assigned number for pretest (ranging from 1 to 17) were recorded onto a data sheet. This data sheet was utilized to match pre and posttests of participants, in addition to contacting participants who did not return for the posttest. All participants (experimental and control groups) completed the pretest (15 minutes). In addition, the participants of the experimental group viewed the PPHS presentation (8-minutes) as a group after completing the pretest. There were no individual or group discussions following the presentation. At the conclusion of day one, participants received a gift bag, in addition to a flyer to remind them of the posttest date and the opportunity to win a \$25 cash prize.

On the second day, 30 days after participants had completed the pretest, the researcher returned to each site to administer the posttest. Each participant was issued a posttest with the same number as their pretest. After completing the posttest, participants' names were placed in a drawing for the \$25 cash prize. At the conclusion of the study, one name was drawn per center for the \$25 cash prize. A Home Safety Brochure was issued to participants, which was a replica of suggestions mentioned in the PPHS presentation.

The researcher contacted individuals who did not return for the posttest to obtain a mailing address. Once participants agreed to complete the posttest, a packet was mailed to them that consisted of the initial cover letter for participating, posttest and a stamped address envelope. Data from individuals who did not complete the posttest were not included in the analyses or reporting of results. All collected data and information sheets were kept confidential and secure throughout the study, in addition to being shredded at the conclusion of the study.

Data Analysis

Data were analyzed utilizing the 14 version of the Statistical Package for Social Sciences (SPSS). Appropriate descriptive statistics, including frequencies, percentages, and means were reported revealing the sample's characteristics. Means scores were determined for each of the twelve centers as opposed to utilizing individual participant scores. Analyses of variance (ANOVA) were performed comparing the differences between the pre and posttest mean scores of the groups to determine if the PPHS presentation was effective in enhancing awareness, knowledge, and behavior change. To gain insight as to why older adults engaged in or did not engage in home modifications, content analysis was conducted on the behavior responses. Participants' responses were organized and grouped into a meaningful manner. The total number of responses for each available option was computed, in addition to the percentage for each response.

Results

To ensure that the research groups were equal prior to administering the intervention, an ANOVA was conducted on the pretest mean scores of the twelve centers. The pretest mean scores were calculated by using the total score from the pretest, a combination of the awareness, knowledge and behavior scores. No significant difference was found between the groups, $F(1, 10) = 0.893, p > .05$. Therefore, the two groups were the same at the beginning of the study.

An ANOVA was conducted utilizing the total mean differences (awareness + knowledge + behavior) between the pre and posttest of the control and experimental groups. The posttest was administered to participants 30 days after taking the pretest. A significant difference was found between the groups, $F(1, 10) = 21.63, p < .05$. This analysis revealed that the experimental group had a greater mean difference between the pre and posttest (2.26) than centers of the control group (0.23).

An ANOVA was conducted utilizing the mean differences between the pre and posttest of the control and experimental groups regarding the awareness variable. Significant difference was found between the groups, $F(1, 10) = 6.866, p < .05$. This analysis revealed that participants of the experimental group had a greater mean difference between the pre and posttest (0.74) than centers of the control group (0.21).

An ANOVA was conducted utilizing the mean differences between the pre and posttest of the control and experimental groups regarding the knowledge variable. A significant difference was found between the groups, $F(1, 10) = 8.14, p < .05$. This analysis revealed that centers of the experimental group had a greater mean difference between pre and posttest (1.37) than centers of the control group (0.29).

Table 1

ANOVA Results: Mean Differences of Total and Individual Variables

	Mean Difference	SD	F	p-value
Total				
Control	.2267	.8018	21.63	.001*
Experimental	2.2583	.7086		
Awareness				
Control	.2067	.1634	6.87	.026*
Experimental	.7433	.4743		
Knowledge				
Control	.2867	.5699	8.14	.017*
Experimental	1.3733	.7387		
Behavior				
Control	-.1550	.4253	0.764	.403
Experimental	.1433	.7201		

* $p < .05$.

The pre and posttest mean difference regarding the behavior variable was compared using one-way ANOVA. No significant difference was found, $F(1, 10) = 0.76, p > .05$. Centers of the experimental group did not differ significantly from the participants of the control group at the conclusion of the study. See Table 1 for a summary of the ANOVA results.

A closer look at the awareness (stage) level of participants at pretest revealed that 55 (52.9%) of the participants out of 104 recruited for the study were aware of falls and had already made changes at home (stage 7). The remaining 49 (47.1%) participants were either unaware (stage 1), aware, but never thought about making changes (stage 2), trying to decide (stage 3), decided not to engage in home safety (stage 4), decided to make changes (stage 5) or in the process of making changes (stage 6). See Table 2 for a summary of the awareness (stage) level.

A content analysis was conducted to explore reasons why older adults may or may not engage in home modifications. Analyses revealed that the primary reasons participants' made changes to the home were to avoid falling again and to remain independent. In regards to participants' reason for not making changes to the home, participants stated that changes had already been made or changes were not necessary. A summary of participants' reasons for making/not making changes to prevent falls is located in Table 3.

In addition, the PowerPoint presentation appeared to be a good medium for promoting fall prevention among older adults. The presentation maintained the attention of the participants. Several participants complemented the

presentation design, which supports Austin-Wells et al. (2003) study of the optimal presentation format preferred by community-dwelling older adults.

Limitations

Several limitations characterized this study. The first limitation was not having enough participants being undecided (stage 3) about making changes to their homes. Most participants completing the study were documented in stage seven (52.9 %) and had already made changes to their homes. The second limitation was only allowing 30 days for behavior change to occur among participants. Behavior change may require a longer interval following an intervention. The third limitation was the self-reporting of the participants during the data collection process. The

Table 2

Summary of Awareness (Stage) Level

Stage	Description	Number	Percentage
1	unaware	3	2.9
2	never thought about it	18	17.3
3	undecided	5	4.8
4	decided not to change	9	8.7
5	decided to change	7	6.7
6	making changes	7	6.7
7	already made changes	55	52.9

fourth limitation was not having an equal number of males and females participating in the study. The male to female ratio was approximately 1:2. The final limitation of the study was not having a diverse sample. The participants were primarily from one ethnic group, Caucasians, which may restrict results being generalized to other ethnic groups.

Conclusions

Several conclusions can be drawn from the study. First, seniors are very aware of their risks for falls. The extent of what actions seniors have taken regarding home safety is unknown for those individuals who have already made changes to their homes. Health educators making home assessments, in addition to questioning older individuals regarding past modifications, may be beneficial in determining if prior actions are adequate in reducing their risks for falling. Secondly, the PPHS presentation was a positive experience for seniors. It highlighted changes most individuals may have made, in addition to providing new ideas for making the home safe. Thirdly, presentations like PPHS can serve as a reminder of what changes need to be

made at home, in addition to reinforcing existing awareness and knowledge for seniors.

Recommendations for Health Educators

Health educators have to discover innovative ways to promote behavior change towards fall reduction among older adults. Obtaining feedback from seniors regarding home modifications can be very beneficial in designing fall prevention programs.

Health educators can design a web-based site to promote home safety among older Internet users. A web-based program would allow more access to home safety information, in addition to promoting awareness, knowledge and behavior changes to reduce risks for falling. In addition, the internet can be a useful data collection tool for fall prevention research.

In working with older adults on health issues, particularly fall prevention, health educators should allow enough time to conduct a pre-screening of the awareness (stage) level of participant. Those individuals at a higher awareness level (stage 6 and 7) should be administered the next phase in fall

Table 3

Participants' Reasons for Making/Not Making Changes to Prevent Falls

	Pretest n (%)	Posttest n (%)
Reasons for engaging in home safety		
To keep from falling again	8 (9)	9 (9)
To remain independent	7 (8)	5 (5)
Asked by family / friends	3 (3)	0 (0)
Medical conditions	1 (1)	1 (1)
Reasons for not engaging in home safety		
Already have made changes	34 (38)	42 (43)
Changes were not necessary	20 (22)	28 (29)
Have never thought about it	11 (12)	3 (3)
Need help / money to make changes	9 (10)	4 (4)
Thinking about making changes/decided to make changes	0 (0)	8 (8)

Note: For pretest, 89 participants (86%) responded and 15 did not (14%), with four participants responding twice - selecting two of the available choices. For posttest, 97 participants responded (93%) and 7 did not (7%), with three participants responding twice.

prevention series to promote behavioral change, which should include exercise, medicine management, and personal risk factors for falls.

Health educators should develop an educational activity to accompany the PPHS presentation, which incorporates a review of both good and bad home safety behaviors. Older adults can engage in open dialog regarding fall prevention, in addition to the allowing the researcher to provide feedback by clarifying any misconceptions.

Health educators can utilize this presentation to educate participants, in addition to family members and caregivers of those at risk for falls. This presentation can be utilized in a variety of settings to promote fall prevention, such as senior centers, church organization, waiting areas of emergency rooms / clinics. In addition, home health care workers can use this presentation during home visits to discuss ways to reduce clients' chances of falling.

Health educators can work with senior centers and home health care agencies in training family members and other senior volunteers to perform home assessments for older individuals at risk for falls. Older adults may feel more comfortable with a familiar face (person they know) coming into their homes to conduct the assessments.

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